IEA INTERNATIONAL ENERGY AGENCY

2015

SNAPSHOT OF GLOBAL PHOTOVOLTAIC MARKETS

PVPS

PHOTOVOLTAIC
POWER SYSTEMS
PROGRAMME

Report IEA PVPS T1-29:2016

WHAT IS IEA PVPS

The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OECD). The IEA carries out a comprehensive programme of energy cooperation among its 29 members and with the participation of the European Commission. The IEA Photovoltaic Power Systems Programme (IEA PVPS) is one of the collaborative research and development agreements within the IEA and was established in 1993. The mission of the programme is to "enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems."

In order to achieve this, the Programme's participants have undertaken a variety of joint research projects in PV power systems applications. The overall programme is headed by an Executive Committee, comprised of one delegate from each country or organisation member, which designates distinct 'Tasks,' that may be research projects or activity areas. This report has been prepared under Task 1, which facilitates the exchange and dissemination of information arising from the overall IEA PVPS Programme.

The participating countries are Australia, Austria, Belgium, Canada, China, Denmark, Finland, France, Germany, Israel, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Thailand, Turkey, and the United States of America. The European Commission, SolarPower Europe, the Solar Electric Power Association, the Solar Energy Industries Association and the Copper Alliance are also members.

Authors

Data: IEA-PVS Reporting Countries, Becquerel Institute (BE), RTS Corporation (JP) SolarPower Europe (EU),
Analysis: Gaëtan Masson, IEA PVPS Task 1
Editing: Mary Brunisholz, IEA PVPS
Design: Becquerel Institute
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CONTENT

A SNAPSHOT OF GLOBAL PV: 2015, THE RECORD-BREAKING YEAR

IEA PVPS has distinguished itself throughout the years by producing unbiased reports on the development of PV all over the world, based on information from official government bodies and reliable industry sources. This fourth edition of the "Snapshot of Global PV Markets" aims at providing preliminary information on how the PV market developed in the last year. The 21st edition of the PVPS complete "*Trends in Photovoltaic Applications*" report will be published in Q3 2016.

In 2015, the PV market broke several records and continued its global expansion, with a 25% growth at 50 GW. After a limited development in 2014, the market restarted its growth, almost everywhere, with all regions of the world contributing to PV development for the first time. Africa, the Middle East, Latin America, South and Southeast Asia saw new markets popping up, already established markets developing faster while the historical PV markets and the already confirmed markets in emerging countries continued to develop.

However, this global growth hides many contrasting developments in various regions. In Asia, after a stabilisation in 2014 the Chinese PV market grew again to around 15,2 GW, but without reaching the announced official targets. In the land of the rising sun, the rapid growth of the Japanese PV market until 2014 continued and the country reached around 11 GW, confirming Asia as the first world region for PV. Next to these two giants, other markets have confirmed their maturity: Korea, Australia, Thailand, Malaysia, the Philippines and Taiwan are now established PV markets. Many others are also showing signs of possible rapid PV development in the coming years, such as Vietnam and Indonesia. On the other hand, India's installation number above 2 GW reflects the positive outlook in this country. India could become one of the global PV market leaders in the coming years. Next to India, Pakistan seems promising with several hundreds of MW installed.

In the Middle East, Turkey installed 208 MW for the very first time, while Israel remained the very first country in terms of cumulative installed capacity with 200 additional MW installed. The announcement of the most competitive bids in the UAE (Dubai) and Jordan shows that there is ample activity foreseen in the region. While these super-competitive tenders have a minority share in the global PV market, they show how competitive PV has become.

In Europe, after years of market decline, the market grew thanks mainly to the growth of the UK market that established itself as the first one in Europe for the second year in a row with 3,5 GW in 2015. Germany experienced another market decline to 1,5 GW, in a context of changed support schemes and new tenders. France stabilized its market close to 0,9 GW while the Italian market, as all markets where feed-in tariffs were phased-out, descended to a rather low level (300 MW), despite a regulatory framework that seems adequate. Some medium-size European markets continued to progress, such as the Netherlands or stabilized such as Switzerland or Austria, while others experienced a new growth at a lower level (Belgium, Denmark, Spain). New smaller markets emerged, such as Poland, Hungary and Sweden, but the level of installations remains below the 100 MW mark. Former GW markets continued to experience a complete shutdown, with between nothing and a few MW installed: Czech Republic, Greece Romania and Bulgaria, for instance.

In Africa, South Africa became the first African country to install close to 1 GW of PV in 2014 but the market declined significantly in 2015 to around 200 MW before a restart. Algeria installed close to 270 MW. Many countries have announced projects, with Egypt leading the pace (5 GW have been announced) but so far, most installations have been delayed or simply are still in the project evaluation phase.

In North America, the US market continued to grow, and reached 7,3 GW in 2015. Canada (600 MW) and, to a lesser extent, Mexico (103 MW) are also progressing. Chile has installed close to 450 MW, together with Honduras (389 MW), but also Guatemala and Uruguay are below the 100 MW mark. Other Latin American markets are expected to develop, especially Brazil, in the coming years.

All of these developments raised the global PV market for the first time to 50 GW, a significant increase from 2014 numbers where around 40 GW were connected to the grid. With a positive outcome in all regions of the world, PV has now reached 1 GW of regional penetration on all continents, and much more on the leading ones.

However the year 2015 was a year of records, and the global installed capacity that reached 50 GW is only one of them. 23 countries have passed the GW mark and the 200 GW mark has been crossed in 2015, with 227,1 GW producing electricity at the end of the year.

Another record broken is the highest capacity installed in one single country: China has beaten the all-time record holder, Germany and, now leads the pace with as much as 43,6 GW compared to 39,7 GW in the European country.

2015 HIGHLIGHTS

Preliminary reported market data shows a growing market in 2015. At least 48,1 GW of PV systems have been installed and connected to the grid in the world last year. While these data will have to be confirmed in the coming months, some important trends can already be discerned:

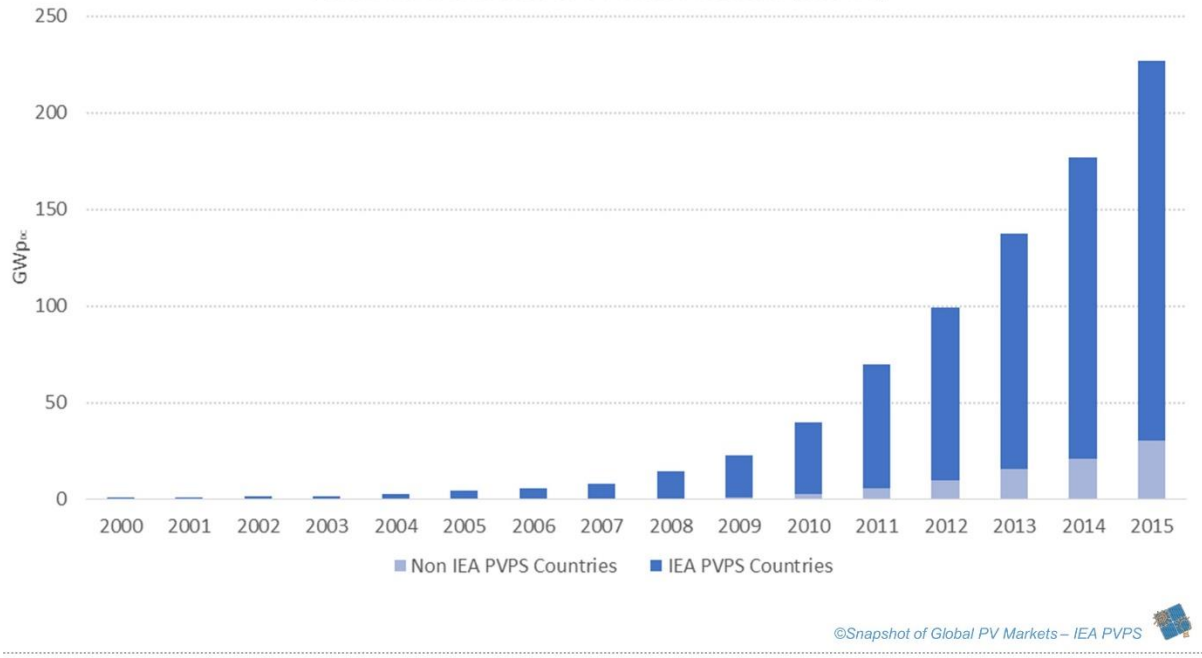
- The global PV market grew significantly, to at least 48,1 GW in 2015. With non-reporting countries, this number could grow up to 50 GW, compared to 40 GW in 2014. This represents a 25% growth year-on-year. The 2 GW comprise non IEA PVPS markets countries such as Pakistan, Uruguay, Brazil, Guatemala and more.
- Asia ranks in first place for the third year in a row with around 60% of the global PV market.
- China reached 15,2 GW in 2015, and is now the leader in terms of cumulative capacity with 43,5 GW.
- Japan continued to grow slightly with around 11 GW installed and connected to the grid in 2015.
- The market in Europe has progressed for the first time in years from 7 GW in 2014 to around 8 GW in 2015.
- The US market increased again to 7,3 GW, with large-scale and third-party ownership dominating.
- Several established markets confirmed their maturity in 2015, including Korea (1,0 GW), Australia (0,9 GW), Canada (0,6 GW), Taiwan (0,4 GW est.) and more.
- India progressed significantly to around 2 GW and Pakistan installed an estimated 600 MW.
- Emerging markets continued to contribute to the global PV development in 2015: South Africa (200 MW), Chile (446 MW), Mexico (103 MW), Turkey (208 MW), Honduras (389 MW), the Philippines (122 MW), Algeria (270 MW) and more.
- The MEA markets experienced growth, thanks to South Africa, Algeria, Israel and Turkey.
- The largest European market in 2015 was UK with 3,51 GW, followed by Germany (1,5 GW) and a stable French market (0,88 GW).
- In the top 10 countries, there are 5 Asia-Pacific countries (China, Japan, India, Korea and Australia), three European countries (UK, Germany and France) and two countries in the North American region (USA, Canada).
- The level to enter the top 10 in 2015 was around 600 MW.
- Italy, Greece and Germany now have enough PV capacity to produce respectively 8%, 7,4% and 7,1% of their annual electricity demand with PV. 22 countries have enough PV capacity to produce at least 1% of their electricity demand with PV.
- PV represents at least 3,5% of the electricity demand in Europe and 7% of the peak electricity demand.
- PV represents around 1,3% of the global electricity demand.
- 23 countries had at least 1 GW of cumulative PV systems capacity at the end of 2015 (2 reached that level in 2015) and 7 countries installed at least 1 GW in 2015 (compared to 9 in 2013 and 5 in 2014).

HOW MUCH PV CAPACITY IS PRODUCING ELECTRICITY IN THE WORLD TODAY?

The total installed capacity at the end of 2015 globally amounted to at least **227,1 GW**. The 24 IEA PVPS countries represented 197 GW of cumulative PV installations together, mostly grid-connected, at the end of 2015. Additional countries that are not part of the PVPS programme represent at least 30 additional GW, mostly in Europe: UK with 8,8 GW, The Czech Republic with 2,1 GW (stable in 2015), Greece with 2,6 GW (stable in 2015), Romania with 1,3 GW and Bulgaria with 1 GW (stable in 2015). Following these countries, India has installed more than 5 GW and Taiwan more than 1 GW, South Africa reached 1,1 GW and Chile 0,85 GW. Many other countries have installed PV systems but none has reached the GW scale. While other countries around the world have reached various PV installation levels, the total of these remains hard to quantify with certainty. At present, it appears that 225,6 GW represents the minimum installed by end 2015 with a firm level of certainty. Remaining installations account for some additional GW installed in the rest of world (non-reporting countries, off-grid installations, etc.) that could bring the overall installed capacity to around than 227,1 GW in total.

China now leads the cumulative capacities with 43,5 GW, followed by Germany with 39,7 GW, followed by Japan (34,4 GW), the USA (25,6 GW) and Italy (18,9 GW). All other countries are far behind in terms of cumulative PV installations and below the 10 GW mark.

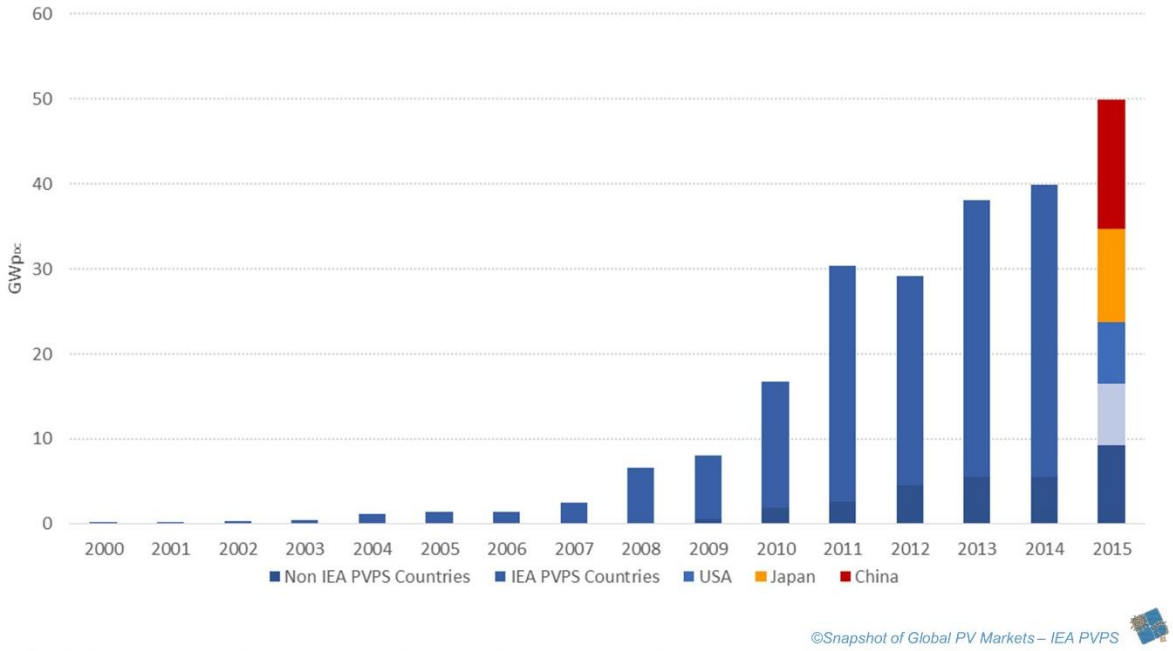
FIGURE 1: EVOLUTION OF PV INSTALLATIONS (GW-DC)



HOW MUCH WAS INSTALLED IN 2015?

The record level of installations in 2015 can be split between PVPS countries and the rest of the world. The PVPS countries have installed 40,8 GW of PV, and at least 7,3 GW have been reported in non IEA PVPS countries from which reliable data are available. We can also estimate that additional non-reported installations contributed to around 2 GW in 2015. The worldwide installed capacity during 2015 totalled at least **48,1 GW and possibly up to 50 GW**, if all reporting and non-reporting countries are taken into consideration.

FIGURE 2: EVOLUTION OF ANNUAL PV INSTALLATIONS (GW - DC)



China's final installation numbers for 2013 and 2014 reached respectively 10,95 and 10,6 GW. This number grew significantly in 2015 to establish itself at 15,2 GW. This continues to reflect the Chinese authorities' ambitions of continuing to develop the internal PV market and especially distributed PV that started to progress in 2014 and 2015. The objective of reaching 35 GW by the year 2015 was achieved and China is now targeting 143 GW by 2020, up from the 100 GW previously announced. **Japan** was the second market for PV in 2014 in 2015 with an estimated 11 GW of PV installations. While final numbers could slightly differ, this shows both countries have driven the PV market in 2014 and again in 2015. The **USA** took third place again in 2015 with 7,3 GW installed compared to 4,75 GW in 2013 and 6,2 GW in 2014.

The **UK** installed 3,5 GW in 2015, taking first place in the European market while **Germany** decreased to 1,5 GW, down from 3,3 GW in 2013 and 1,9 GW in 2014. This happened in a context of reduced feed-in tariffs, changing PV support regulations towards the integration into electricity markets and the introduction of constraining tenders for utility-scale PV plants.

India installed around 2 GW in 2015, a significant leap forward that could lead to an even larger development in the coming years. **Korea** confirmed its development with 1,0 GW of PV installed in 2015, compared to 0,9 GW in 2014.

Together, the top five countries represent more than 78% of the annual installations in 2015 and less than 71% in terms of total installed capacity by the end of 2015. The top seven (countries with more than 1 GW of annual installations) contributed to 83% of the global PV market.

Behind the top seven, no country has installed more than 1 GW of PV systems in 2015. **France** installed 879 MW in 2015. **Australia** remains a strong market with 935 MW installed in 2015 but with a segmentation shift ongoing. Finally, **Canada** installed around 600 MW.

These 3 countries together with the top 7 countries represent 87% of the 2015 (compared to 90% in 2014) world market of annual installations, a sign that the market is diversifying at a very slow pace.

Several markets that have been developing in recent years declined or disappeared in 2015. For example, **South Africa (200 MW est.)** and **Thailand (121 MW)** join the club of booming markets that have decreased significantly, even if they remain promising for the future.

Following the two market leaders in Asia, other markets continued to grow, such as **Taiwan** (400 MW est.), the **Philippines** (122 MW), **Pakistan** (600 MW est.) or remained stable such as **Malaysia** (63 MW) during the fourth year of its feed-in tariff system, as well as a few other countries.

In Europe, **Italy** installed only 300 MW of PV systems, compared to 9,3 GW in 2011, 3,6 GW in 2012 and 1,6 GW in 2013. This can be explained by the phase-out of the feed-in tariffs that are not granted anymore for new PV installations, leaving the market driven by the self-consumption scheme and additional tax rebates that are now in place.

Furthermore, net-metering systems allowed the market to develop in several European countries, but also to collapse once the regulations were changed. In **Denmark,** only 39 MW were installed in 2014 after a change in the net-metering system that prevented a repeat of the 300 MW level of 2012; but in 2015 the market grew again to 183 MW, thanks to a few utility-scale plants. In the **Netherlands,** around 450 MW are expected to have been installed but final numbers are not yet confirmed, after 300 MW in 2014. In markets driven by either feed-in tariffs or tax incentives, significant additions were made in a stable **Switzerland** (at least 300 MW) and **Austria** (150 MW). **Portugal** added 63 MW in 2015, down from 2014, under a new net-billing scheme. In **Sweden, Finland** and **Norway**, PV installations continued to increase with respectively an estimated 51 MW, 5 MW and 2 MW.

Some European countries that previously grew quickly have now stalled or experienced very small or significantly reduced additions. **Spain** reported around 56 MW of new additions in a difficult context of harsh regulations for prosumers including a “solar tax”, which is a tax on self-consumption. The market in **Belgium** that in recent years went down from a GW market

in the context of a subsidy decline as well as with discussions on additional grid costs, stabilized around 95 MW. The PV installed capacity has reached more than 3,2 GW.

In South America, several GW of PV plants have been validated in **Chile** and the real development has finally materialized with close to 450 MW in 2014 and 2015, and much more to come. Several countries adopted policies that could favour the development of PV in the coming years, especially **Mexico**, **Brazil** and **Peru** where, unfortunately, the real PV market remained symbolic. In **Guatemala**, **Uruguay** and especially **Honduras** (389 MW), utility-scale plants dominated the market.

In the Middle East, **Israel** declined slightly, with around 200 MW installed in 2015 while the PV installations in **Turkey** have started off with 208 MW installed in 2015. In Africa, **South Africa** declined after a tremendous year 2014, with around 200 MW installed. **Algeria** has installed 270 MW in 2015 and will continue to develop its installations.

MAIN REGULATORY CHANGES

CALL FOR TENDERS

In 2015 several countries introduced competitive call for tenders to grant power purchase agreements (PPA, another name to quality feed-in tariffs). This was the case for the USA, South Africa, France, Germany, India, Jordan, Peru, Panama and the UAE (Dubai), to consider the most interesting examples. France has been using this way of granting PPAs to medium-to-large scale PV systems for some years already, including from commercial installations. Germany has decided to opt for tenders for large-scale PV from 2015 onwards that were granted with low PPAs. The Netherlands and Brazil have also set up reverse auctions in which PV is trying to find a place to compete. While this method has not yet fully proven that it can ensure a smooth and sustainable PV market development, it brings with it the possibility of controlling the electricity mix development and has shown how low the cost of PV electricity could go under constraints. For instance, Peru awarded PPAs at the beginning of 2016 as low as 48 USD/MWh, a record-low level without financial incentives, beating the UAE's (Dubai's) previous record.

ELECTRICITY MARKETS INTEGRATION

Europe has started to favour the market integration of renewables, including solar PV. While this is more a recommendation than a compulsory decision, several countries are modifying their support schemes in order to make them more "market compliant." Consequently, Germany and the UK, for instance, have introduced feed-in premiums with a variable premium that compensates for the variations of electricity market prices. This situation has started to be translated in several other countries, with a significant PV market decline at first sight.

RETROACTIVE MEASURES

In 2015, several countries continued to introduce retroactive changes in the PV support policies for existing PV plants. The most important changes took place in Spain, which imposed retroactive measures to PV system owners arguing about difficult economic conditions. In Italy, in order to reduce the impact of PV on the electricity consumers, the government imposed a decrease of the FiT level compensated by an increase of the payment years. Other countries also applied retroactive measures that reduced the level of financial support or changed the conditions applying to already existing PV systems. Bulgaria, Romania and the Czech Republic have discussed or applied such measures in the last three years, often with the consequence of destroying investors' confidence and bringing down the PV market.

GRID FINANCING AND ADDITIONAL TAXES

In Belgium, the region of Flanders has imposed a grid connection tax in 2015 aimed at compensating for the losses in grid revenue linked to the existing net-metering scheme. This same question has been raised by policymakers and grid operators in several countries. In the USA, several debates took place with regard to the compensation of net-metering policies, with the consequence of establishing either caps to net-metering or small additional fees. While the outcome was still positive at the beginning of 2015, the decision was made in

Nevada to restrict net-metering policies and to buy electricity below market rates. Other countries such as Italy and Spain have either setup or discussed additional taxes on solar PV systems. In Germany, the decision has been taken to force prosumers to pay a significant percentage of the levy paid by electricity consumers to finance renewables incentives, even on the self-consumed part of the PV electricity.

SUPPORT POLICIES EVOLUTION

The decrease of financial support continued in 2015 at a slower pace. However, the arrival of call for tenders pushed down the LCOE of PV systems to extreme limits. 48 USD/MWh has been recorded in Peru, and similar levels have been seen in other calls in other countries. In Germany, the tendering process granted PPAs below 90 USD/MWh.

The number of countries using feed-in tariffs remained relatively stable, even if UK and Germany are moving rapidly in the direction of feed-in premiums. In general, emerging markets are selecting tenders as a way to grant PPAs, and the distributed segments benefit from self-consumption schemes such as net-metering or net-billing. Few countries are stepping directly in the self-consumption regulations that apply to set-up clear measures for valuing exported electricity.

Countries that adopted a quota system with green certificate trading are diminishing. Korea, Romania, Australia and, to a certain extent, Belgium and Sweden are still using this support scheme to incentivize PV. Several countries are now supporting PV through a combination of incentives.

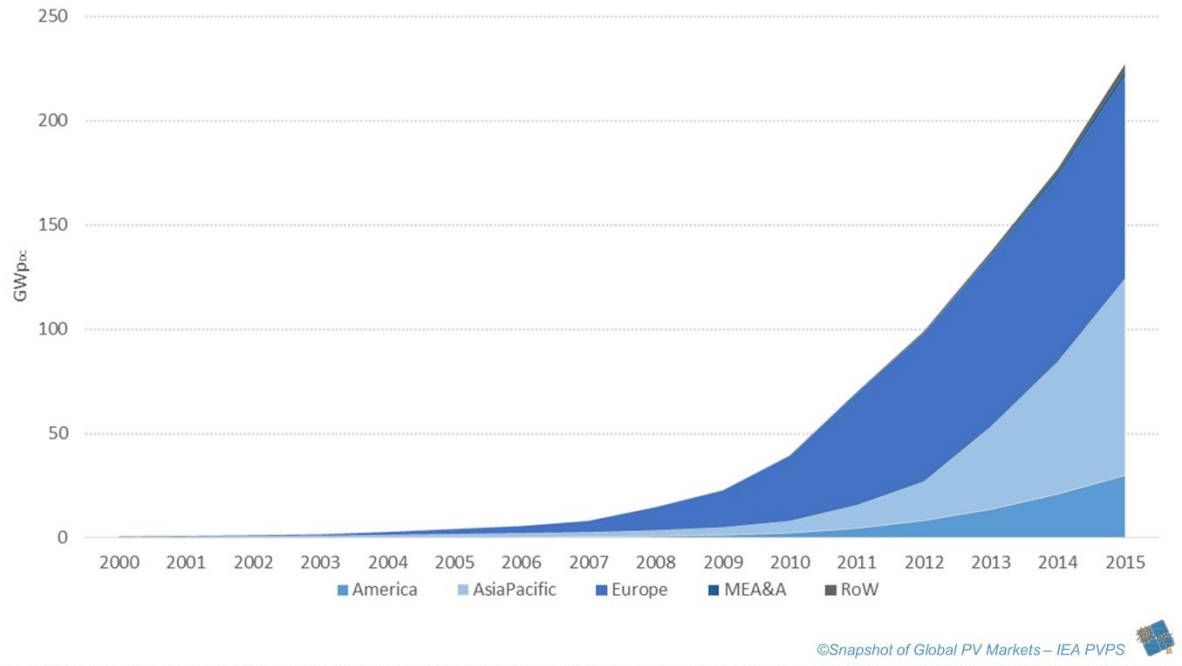
FROM PRODUCERS TO *PROSUMERS*

The idea that PV producers could be considered as “prosumers” – both producers and consumers of energy – is evolving rapidly and policies are being adapted accordingly in several countries. Net-metering policies are being considered in some countries such as Mexico (these policies have previously supported market development in the USA, Canada, Denmark but with a reduced compensation period), The Netherlands, Portugal, Sweden, Korea and partially in Belgium and many countries around the world are either discussing its introduction or a variant through self-consumption. Therefore, self-consumption is becoming a major driver of distributed PV installations. In general, distributed PV is becoming a driver of change in the traditional roles in the energy market. New regulations will be needed to better control and frame this development.

EVOLUTION OF TOTAL INSTALLED PV CAPACITY PER REGION

While Europe represented a major part of all installations globally, Asia's share started to grow rapidly in 2012 and this growth was confirmed in recent years. Now Europe represents around 42% of the total installed capacity and this percentage shall continue decreasing in the coming years. Asia represents the same level as Europe with 42% and the Americas 13%, while the 3% remaining cover the MEA region. Figure 3 shows the relative share of cumulated PV installations in four regional market segments.

FIGURE 3: EVOLUTION OF REGIONAL PV INSTALLATIONS (GW - DC)



AC & DC NUMBERS, GRID-CONNECTED AND OFF-GRID

PVPS counts all PV installations, both grid-connected and off-grid. By convention, the numbers reported refer to the nominal power of PV systems installed. These are expressed in W (or Wp). Some countries, such as Spain, Canada or Japan, are reporting the power output of the PV inverter (the device converting DC power from the PV system into AC electricity compatible with standard electricity networks). The difference between the standard DC power (in Wp) and the AC power can range from as little as 5% (conversion losses, inverter set at the DC level) to as much as 40%. For instance, some grid regulations in Germany limit output to as little as 70% of the peak power from the PV system. Most utility-scale plants built in 2015 have an AC-DC ratio between 1,2 and 1,4. Canada, Chile, Japan (since 2012) and Spain report officially AC numbers. The numbers indicated in this report have been transformed to DC numbers to maintain the coherency of the overall report.

THE TOP 10 COUNTRIES IN 2015

In the major evolutions, 7 of the top 10 markets for PV in 2015 have installed at least 1 GW of PV systems (up from 5 in 2014). Looking at the total installed capacity, 23 countries are entering the 1 GW club.

As mentioned earlier, capacities for the few countries that report PV installations in AC power, have been converted in DC power to facilitate comparison. This can lead to discrepancies with official PV data in several countries such as Canada, Japan and Spain.

TABLE 1: TOP 10 COUNTRIES FOR INSTALLATIONS AND TOTAL INSTALLED CAPACITY IN 2015

	TOP 10 COUNTRIES IN 2015 FOR ANNUAL INSTALLED CAPACITY				TOP 10 COUNTRIES IN 2015 FOR CUMULATIVE INSTALLED CAPACITY		
1		China	15,2 GW	1		China	43,5 GW
2		Japan	11 GW	2		Germany	39,7 GW
3		USA	7,3 GW	3		Japan	34,4 GW
4		UK	3,5 GW	4		USA	25,6 GW
5		India	2 GW	5		Italy	18,9 GW
6		Germany	1,5 GW	6		UK	8,8 GW
7		Korea	1 GW	7		France	6,6 GW
8		Australia	0,9 GW	8		Spain	5,4 GW
9		France	0,9 GW	9		Australia	5,1 GW
10		Canada	0,6 GW	10		India	5 GW

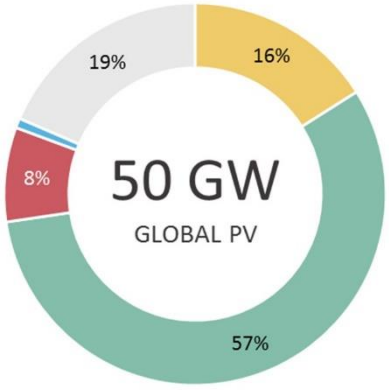
Global PV Market 2015

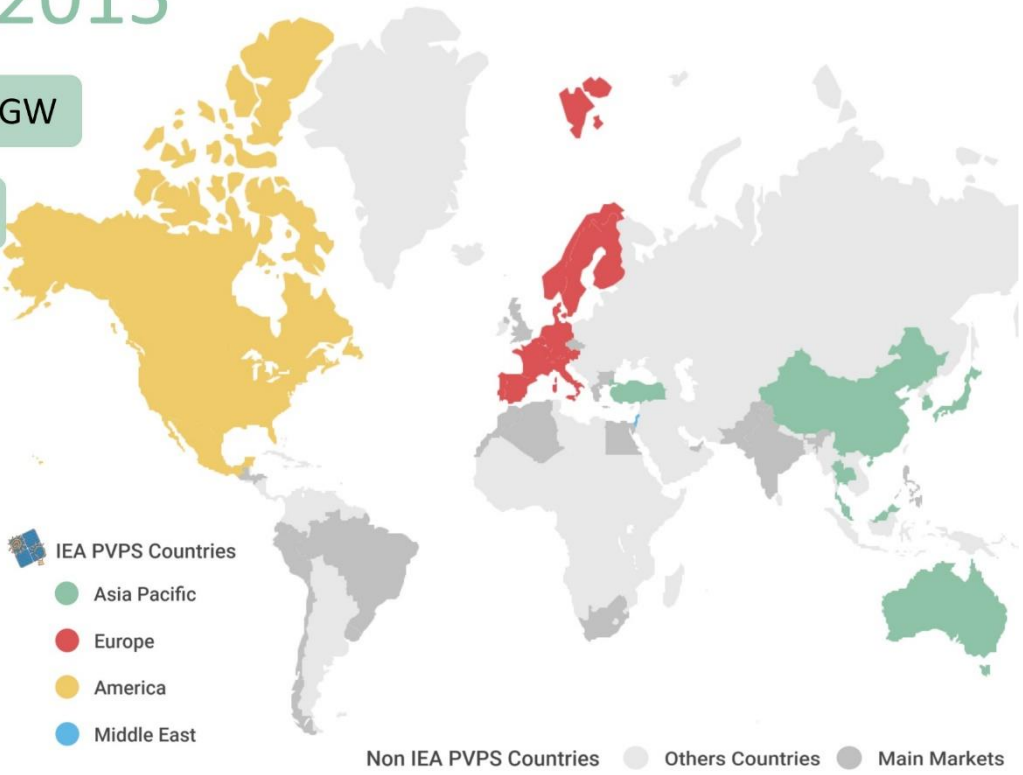
TOP PV MARKETS 2015

1st CHINA 15,2 GW

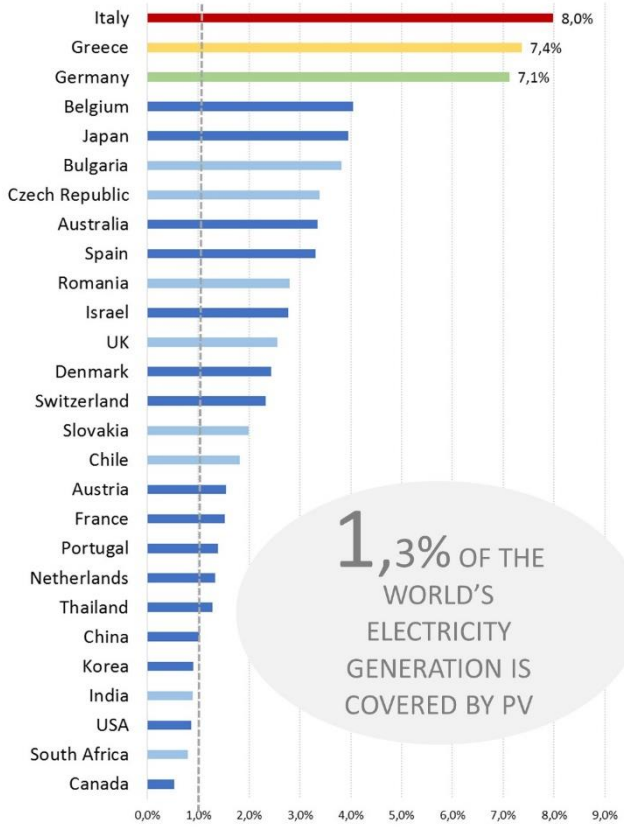
2nd JAPAN 11,0 GW

3rd USA 7,3 GW





2015 THEORETICAL PV PRODUCTION



1,3% OF THE WORLD'S ELECTRICITY GENERATION IS COVERED BY PV

227 GW has been installed all over the world by the end of 2015

China is the world's 1st PV market

23 countries had at least 1 GW of cumulative PV capacity at the end of 2015

7 countries installed at least 1 GW each in 2015

SOLAR PV PER CAPITA 2015 Watt/capita

1st GERMANY 491

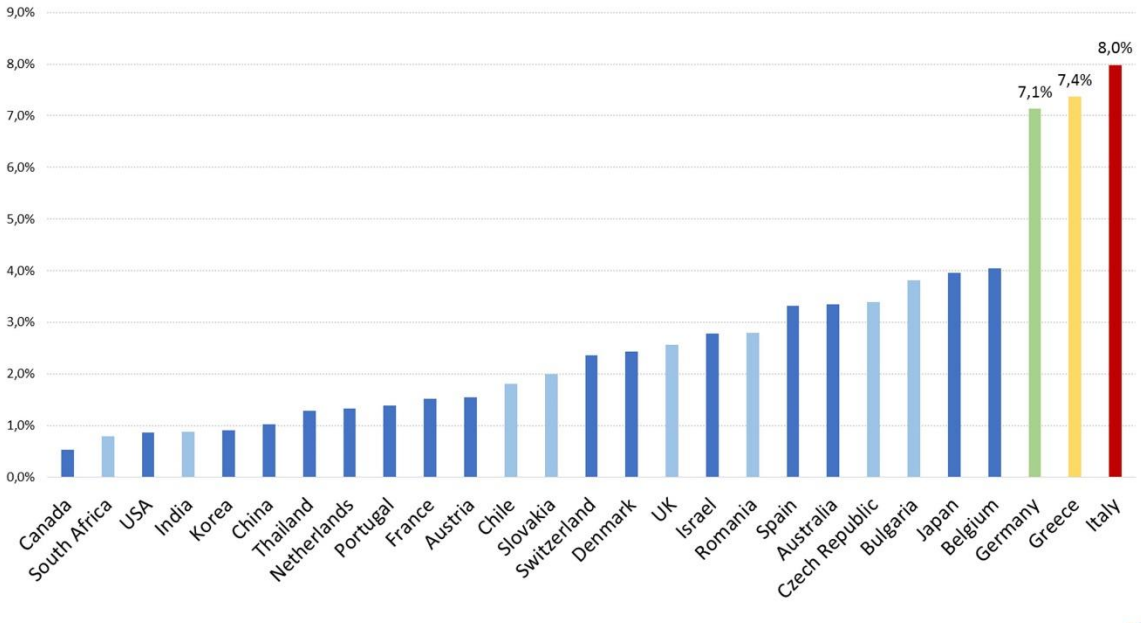
2nd ITALY 308

3rd BELGIUM 287

ELECTRICITY PRODUCTION FROM PV

PV electricity production is easy to measure for a power plant but much more complicated to compile for an entire country. In addition, the comparison between the installed base of PV systems in a country at a precise date and the production of electricity from PV are difficult to compare. A system installed in December will have produced only a small fraction of its regular annual electricity output; systems installed on buildings may not be at optimum orientation, or may have partial shading during the day; and/or the weather in 2015 may not have been typical of the long term average. For these reasons, the electricity production from PV per country as shown below estimates what the PV production could be based on regarding the cumulative PV capacity at the end of 2015; close to optimum siting, orientation and average weather conditions.

FIGURE 4: NATIONAL PV PENETRATION IN % OF THE ELECTRICITY DEMAND BASED ON 2015 CAPACITIES



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In several countries, the PV contribution to the electricity demand has passed the 1% mark with Italy in first place with close to 8% and the overall European PV contribution amounting to at least 3,5 % of the electricity demand of Europe. China, the Netherlands and Chile have also passed the 1% mark while larger consumers of electricity such as the USA should reach this threshold in 2016. In total, 22 countries already produce at least 1% of their electricity needs with PV. Figure 4 shows how PV theoretically contributes to the electricity demand in key countries (IEA PVPS and others), based on the PV capacity installed by the end of 2015.

CONCLUSION AND FUTURE PROSPECTS IN PVPS COUNTRIES

Solar PV technology continued to expand in 2015 on all continents. Once driven by financial incentives in developed countries, PV has started to progress in developing countries, answering a crucial need for electricity. Whereas in several developed countries, PV comes in direct competition with existing plants from incumbent utilities and in emerging countries, PV already helps to satisfy a growing need for energy in general and electricity in particular.

In that respect, the super-competitive tenders seen in many countries around the world are sending a clear sign to policymakers that PV can now compete with most fossil and nuclear sources of energy. The success of the COP21 in Paris at the end of 2015 couldn't have had a better resonance than the announcements that PV could contribute significantly to decarbonizing the electricity mix of the planet, sooner than expected and at a reasonable cost.

Today PV has become a major actor in the electricity sector in several countries. Globally, close to 275 TWh, or 275 billion kWh will be produced in 2016 by PV systems installed and commissioned until January 2016. This represents about 1,3% of the electricity demand of the planet, though some countries have reached rapidly significant percentages.

Around 227 GW of PV are now installed globally, at least 10 times higher than in 2009. The total PV capacity was multiplied by 10 in only 6 years while the market was multiplied by almost 40 in 10 years.

Finally, the growth of Asian markets in 2014 and 2015 confirms the PV market landscape change from previous years. With declining prices in the last few years, PV has appeared on the radar of policymakers in charge of energy policies in numerous countries and plans for PV development have increased rapidly all over the world. With dozens of countries developing PV now, and much more to come, the globalisation of PV is now a reality.

In PVPS countries, several Asian countries have announced their intention to continue developing PV, and the market should continue to develop in North America as well. In Europe, the picture is more contrasted with a complex process of transitioning from the current financially supported market to a more competitive PV market. All these elements considered together should maintain the PV market in an upward trend in the coming years.

SYNTHESIS TABLE

Table 2 compiles preliminary information valid as of 25 March 2016. PVPS countries' data are issued by national experts. Data related to non IEA PVPS countries are estimates that have been delivered by SolarPower Europe or the Becquerel Institute in Belgium and RTS Corporation in Japan. Data for some IEA-PVPS countries may still be updated by national authorities. In particular, data for Belgium, Canada, Korea and the Netherlands are not definitive but official estimates. Updated data will be published in the next edition of the complete report *"TRENDS 2016 In Photovoltaic Applications."*

Solar yield data has been provided by member countries or GIS data providers.

Electricity production is a **theoretical calculation** based on average yield and the PV installed capacity as of the **31 December 2015**. Real production data could differ due to differences in irradiation across the countries themselves and the characteristics of the PV power plants considered.

Electricity consumption data has been provided by official authorities. In most cases, 2014 or older data have been used when 2015 data was not yet available.

TABLE 2: ANNUAL AND CUMULATIVE INSTALLED PV POWER 2015

	ANNUAL INSTALLED CAPACITY	CUMULATIVE INSTALLED CAPACITY
China	**15,15 GW**	**43,53 GW**
Japan	**11 GW**	**34,41 GW**
USA	**7,3 GW**	**25,62 GW**
UK	**3,51 GW**	**8,78 GW**
India	**2 GW**	**5,05 GW**
Germany	**1,45 GW**	**39,7 GW**
Korea	**1,01 GW**	**3,43 GW**
Australia	935 MW	**5,07 GW**
France	879 MW	**6,58 GW**
Canada	600 MW	**2,5 GW**
Pakistan	600 MW	**1 GW**
Netherlands	450 MW	**1,57 GW**
Chile	446 MW	848 MW
Taiwan	400 MW	**1,01 GW**
Honduras	389 MW	389 MW
Switzerland	300 MW	**1,36 GW**
Italy	300 MW	**18,92 GW**
Algeria	270 MW	300 MW
Turkey	208 MW	266 MW
South Africa	200 MW	**1,12 GW**
Israel	200 MW	881 MW
Denmark	183 MW	789 MW
Austria	150 MW	937 MW
Philippines	122 MW	155 MW
Thailand	121 MW	**1,42 GW**
Mexico	103 MW	282 MW
Romania	102 MW	**1,33 GW**
Belgium	95 MW	**3,25 GW**
Portugal	63 MW	454 MW
Malaysia	63 MW	231 MW
Spain	56 MW	**5,44 GW**
Sweden	51 MW	130 MW
Greece	10 MW	**2,61 GW**
Czech republic	16 MW	**2,08 GW**
Finland	5 MW	20 MW
Norway	2 MW	15 MW

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